

Daguerre Point Dam Fish Passage Improvement Project

Analysis of Potential Benefits to
Salmon and Steelhead from
Improved Fish Passage






E N T R I X






US Army Corps
of Engineers ®




Background

-  Collaborative effort
-  The lead agencies are the CDWR and the USACOE
-  Assess fish passage benefits in support of the impact assessment for the EIR/EIS.





Study Purpose

-  Identify the extent of spawning habitat
-  Determine how Daguerre Point Dam may affect access to and use of this habitat
-  Identify the potential benefits from enhanced fish passage at the Daguerre Point Dam



Rationale

-  The extent and quality of spawning and rearing habitat available to adult salmon and steelhead in the lower Yuba River may vary by alternative.
-  Passage alternatives that do not involve a change in dam elevation may be analyzed as a group.
-  Passage alternatives that involve lowering or removing the dam (thus resulting in less sediment trapping by the dam) may be evaluated as a group.

Scope of Work

-  How much suitable spawning habitat is available?
-  What is the current level of habitat use?
-  Would improved passage at Daguerre Point Dam affect spawning and rearing?
-  How do alternatives affect spawning, rearing or change impacts?

Scope of Work

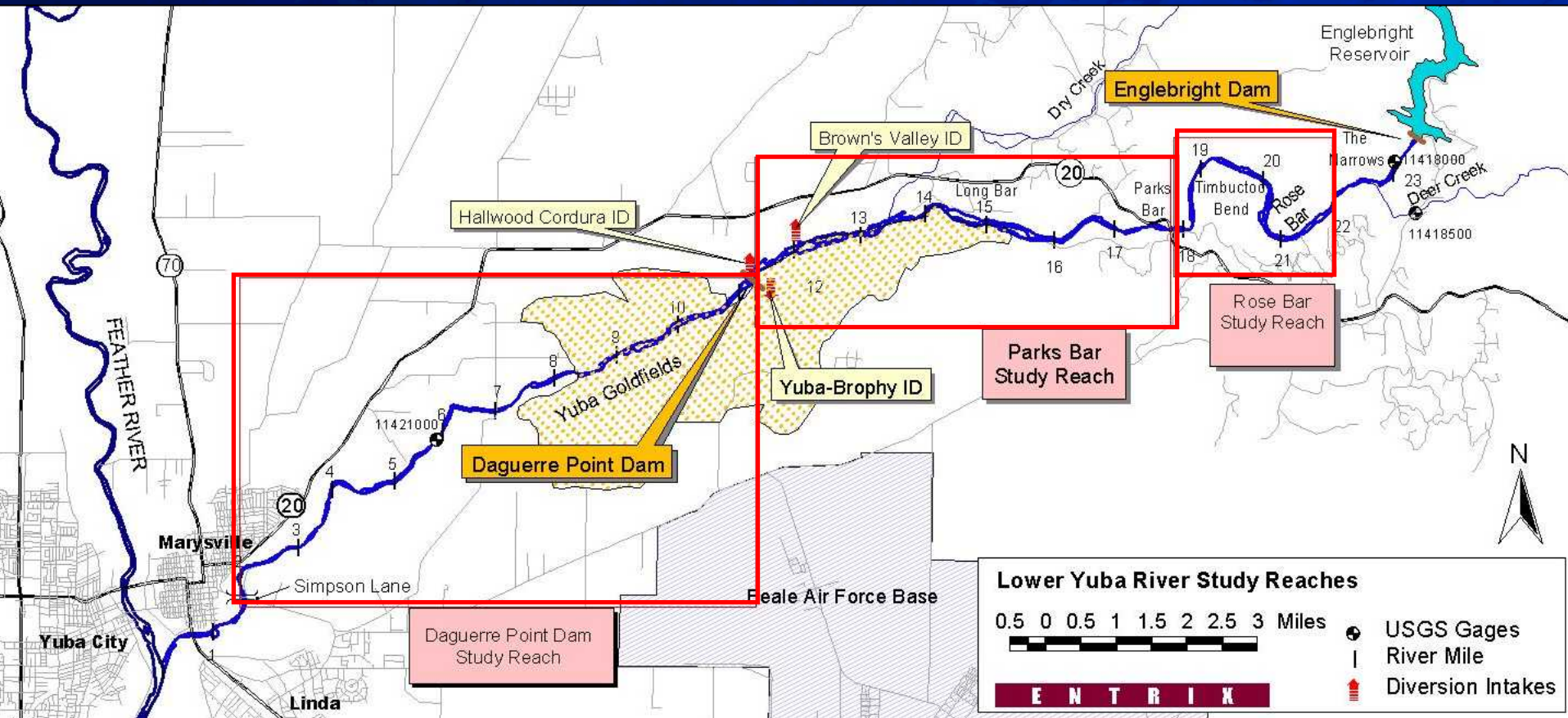
-  How might other factors affect net benefits from passage improvement and from the various alternatives?
-  What changes in flow management are needed to address concerns about potential delay in emigration and associated exposure of juveniles to adverse temperature and predation during emigration?

Study Area



Lower Yuba River Study Reaches

- Rose Bar (~4 miles)
- Parks Bar (~6.3 miles)
- Daguerre Point Dam (6.8 miles)





Existing Data Resources

- 🐟 California Department Fish and Game
 - Fall-run Chinook salmon Carcass Counts and Spawning Escapement Data (1953-1989)
 - Spring-run Chinook Salmon Surveys 1998, 2000

- 🐟 U.S. Fish and Wildlife Service (*Field Notes and GPS Coordinates*)
 - 2001 Fall-run Chinook Salmon
 - 2001 Spring-run Chinook Salmon Redd Counts
 - 2002 Steelhead Redd Counts

Existing Data Resources

-  YCWA (Jones & Stokes)
 - Fall-run Chinook salmon Carcass Counts and Spawning Escapement Numbers (1990 to 2001)
 - 2000 Fall-run Chinook Salmon Redd Survey Map

-  ENTRIX, Inc.
 - Field Observations, 11 September 2002 (Rose Bar to Hallwood Blvd)

Recent Chinook Redd Surveys

Rose Bar Reach

Data Source	Year	Run	Redds	Redds/mile
CDFG	1998	Spring	130	32.6
CDFG	2000	Spring	155	38.8
Jones and Stokes	2000	Fall	305	76.4
USFWS (Unpub. Data)	2001	Fall	291	73
USFWS (Unpub. Data)	2001	Spring	151	37.8

Recent Chinook Redd Surveys

Parks Bar Reach

Data Source	Year	Run	Redds	Redds/mile
CDFG	1998	Spring	76	12.0
CDFG	2000	Spring	50	7.9
Jones and Stokes	2000	Fall	180	28.4
USFWS (Unpub. Data)	2001	Fall	360	57
USFWS (Unpub. Data)	2001	Spring	88	13.9

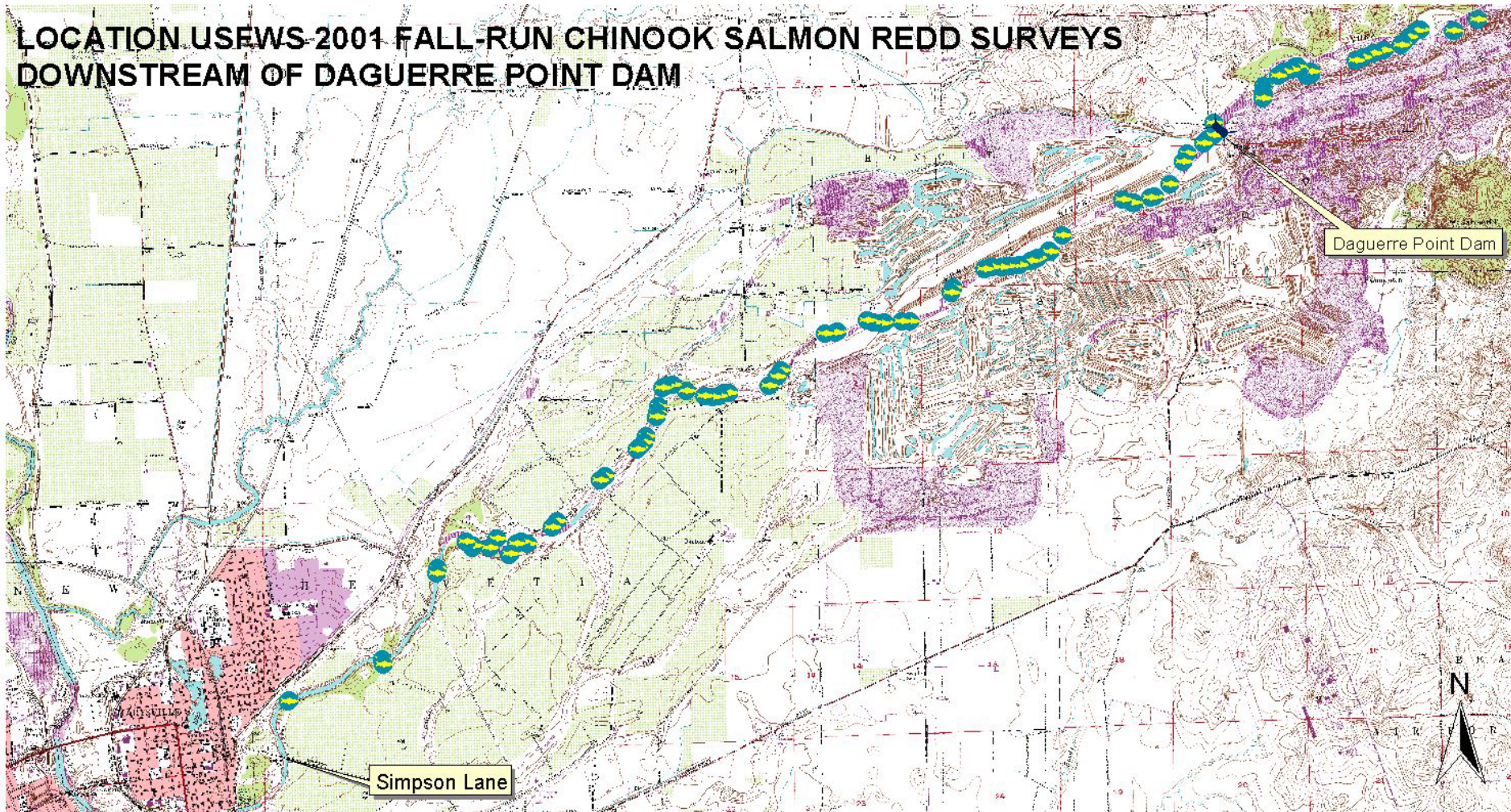
Recent Chinook Redd Surveys

Daguerre Reach

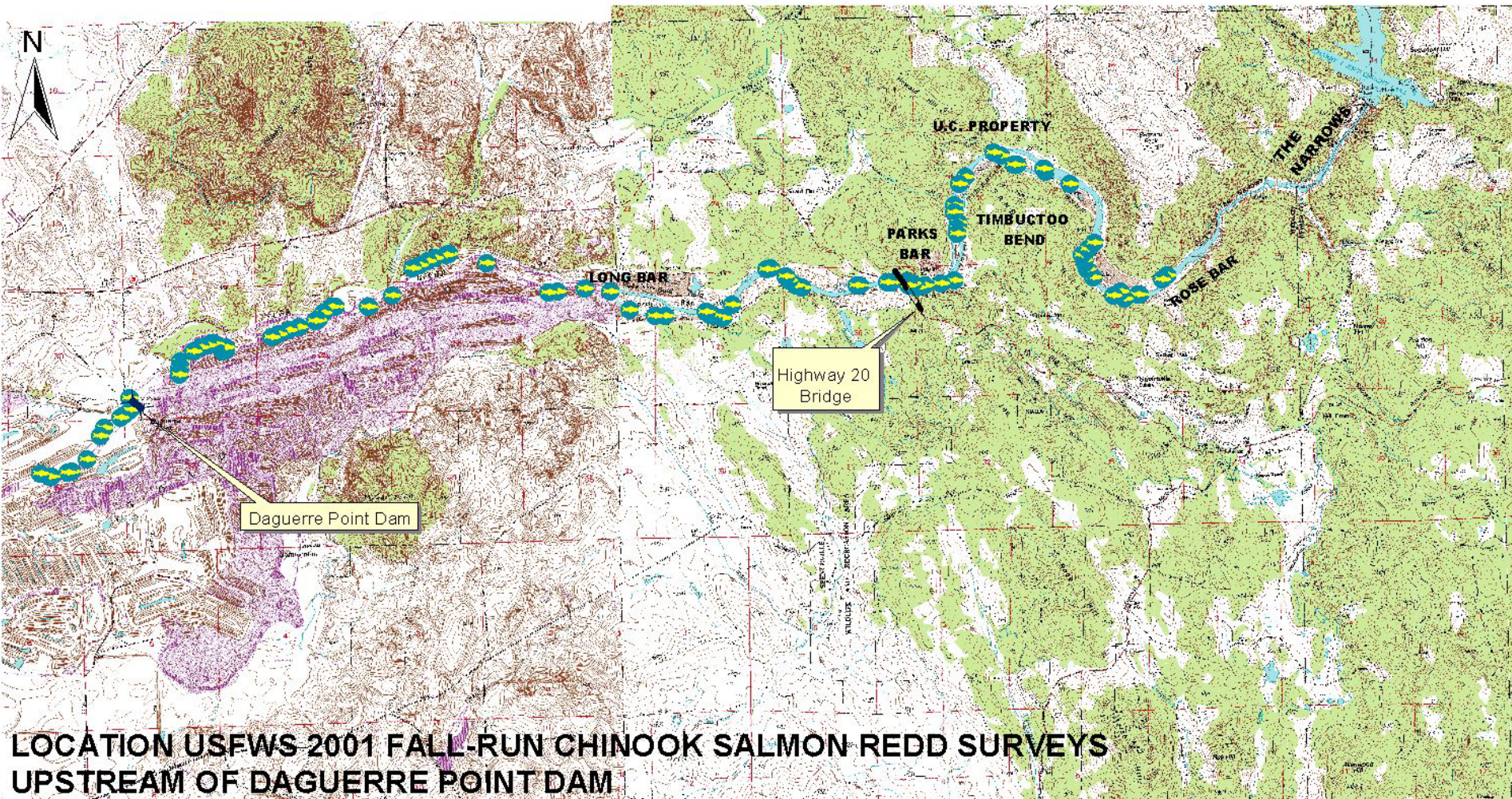
Data Source	Year	Run	Redds	Redds/mile
CDFG	1998	Spring	None Observed	
Jones and Stokes	2000	Fall	370	54.4
USFWS (Unpub. Data)	2001	Fall	691	101.6
USFWS (Unpub. Data)	2001	Spring	Not surveyed	

Fall-Run Chinook Salmon Redds Downstream of Daguerre Point Dam

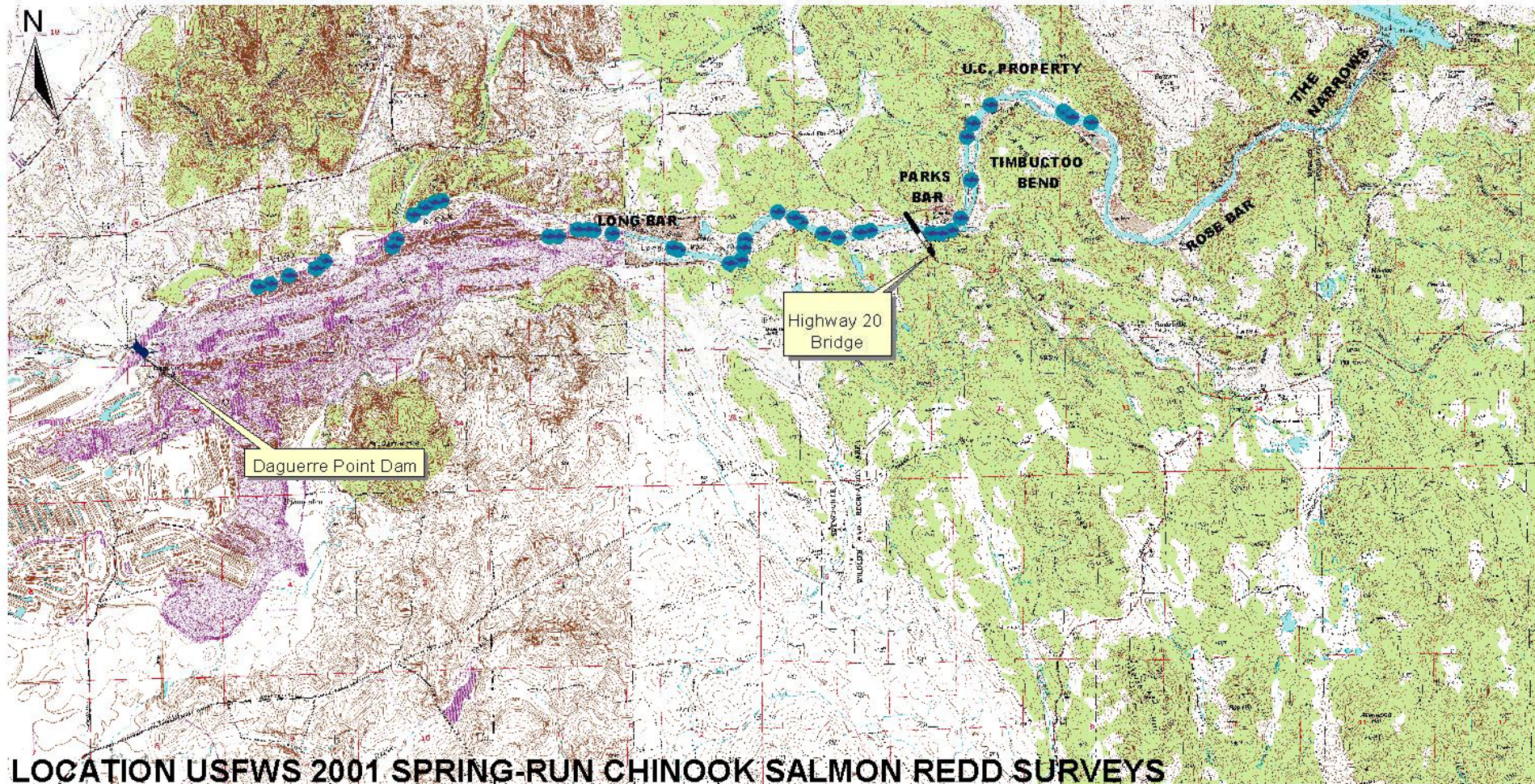
LOCATION USEWS 2001 FALL-RUN CHINOOK SALMON REDD SURVEYS
DOWNSTREAM OF DAGUERRE POINT DAM



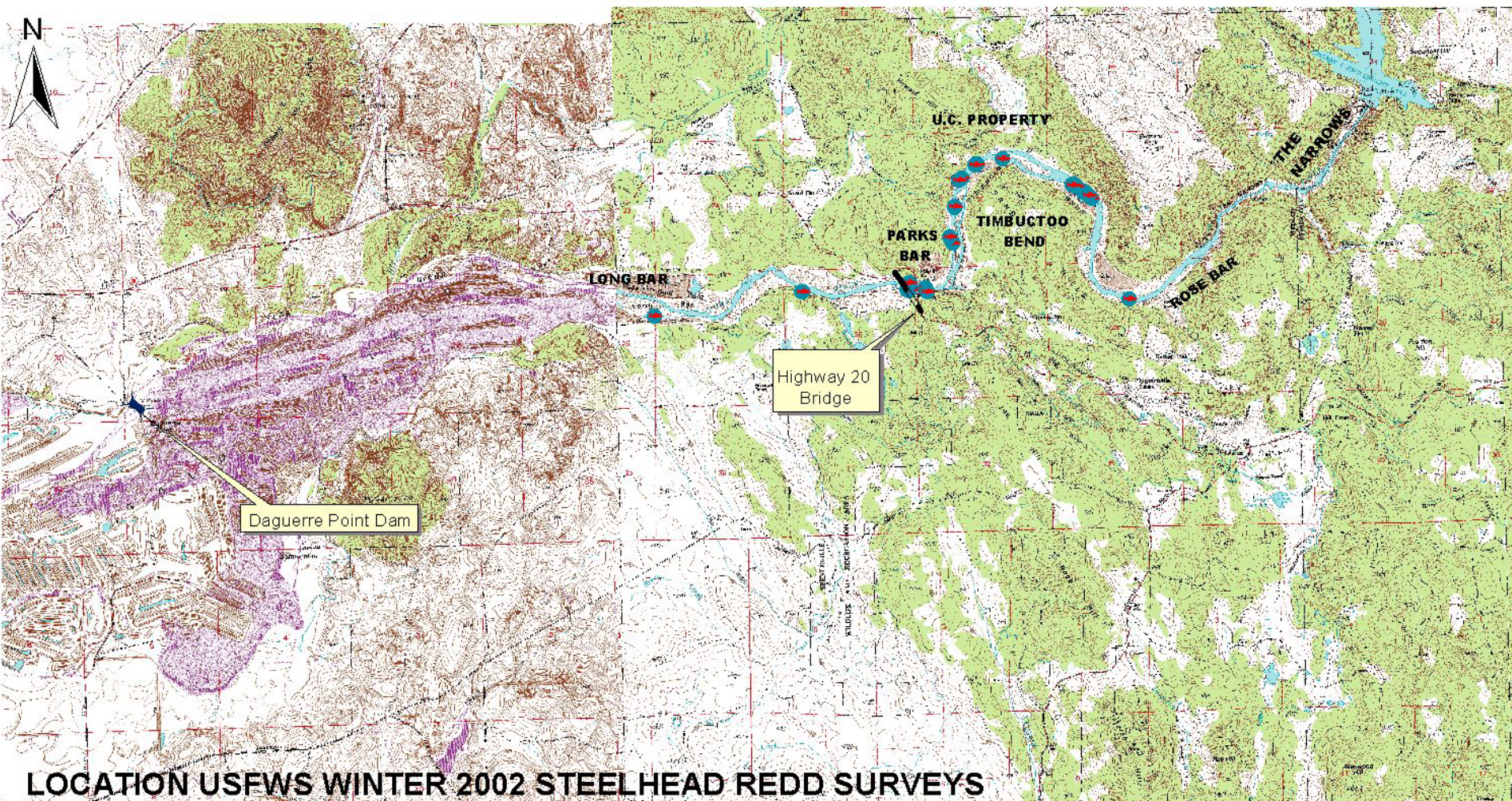
Fall-Run Chinook Salmon Redds Upstream of Daguerre Point Dam



Spring-Run Chinook Salmon Redds Upstream of Daguerre Point Dam



Steelhead Redds Upstream of Daguerre Point Dam



Fall-Run Chinook Salmon Spawning Escapements (Counts)

Year	Rose Bar	Parks Bar	Daguerre	Totals		
	Total	Total	Total	Adults	Grilse	Total
1994	3,894	5,008	2,418	7,062	4,258	11,320
1995	2,257	6,609	5,695	13,292	1,269	14,561
1996	10,213	8,679	8,628	23,172	4,348	27,520
1997	7,425	9526	8,827	18,975	6,803	25,778
1998	7,797	10,509	12,496	25,665	5,137	30,802
1999	4,931	7,461	10,675	17,853	5,214	23,067
2000	4,572	5,860	4,417	12,921	1,928	14,849
2001	8,407	8,652	5,325	20,849	1,535	22,384

Source: Jones and Stokes (1995-2002)

Lower Yuba River Fall-Run Chinook Escapements and Redd Survey Data for 2000 and 2001.

Reach	Adult Escapement	Redds	Redds per Mile	Adults per Redd
2000				
Rose Bar	4,135	305	76.4	13.5
Parks Bar	4,970	180	28.4	27.6
Daguerre	3,816	370	54.4	10.3
TOTAL	12,921	855	49.9	15.1
2001				
Rose Bar	7,833	291	73	26.9
Parks Bar	7,721	360	56.8	21.4
Daguerre	5,265	691	101.6	7.6
TOTAL	20,849	1,342	78.3	15.5

Source: Jones and Stokes (1995-2002), and unpublished data from USFWS 2002






Percent of Total Spawning by Reach 1994 to 2001

Year	Rose Bar	Parks Bar	Daguerre
1994	34.4	44.2	21.4
1995	15.5	45.4	39.1
1996	37.1	31.5	31.4
1997	28.8	37.0	34.2
1998	25.3	34.1	40.6
1999	21.4	32.3	46.3
2000	30.8	39.5	29.7
2001	37.6	38.7	23.8
Range	15.5 – 37.6	31.5 - 45.4	21.4 - 46.3






Mean Daily August and September Discharge Versus Percent Spawning Above DPD, 1994 - 2001

Year	Mean August Flow (cfs)		Mean September Flow (cfs)		Percent Spawning Above DPD
	Smartville	Marysville	Smartville	Marysville	
1994	1,024	428	604	436	78.6
1995	2,057	1,325	1,117	862	66.8
1996	2,400	1,602	1,154	1,000	68.6
1997	2,236	2,051	773	601	65.8
1998	2,884	2,214	1,712	1,453	59.4
1999	2,693	2,147	1,282	1,161	53.7
2000	1,639	1,053	1,081	958	70.3
2001	1,699	1,270	677	522	76.3







Other Factors

-  Cobble Barrens
-  Sparse Riparian Vegetation (SRA)
-  Gravel Recruitment
-  Large Woody Debris
-  Predation
 - Sacramento Pikeminnow
 - Striped Bass
 - Smallmouth Bass
 - American Shad
 - Other

Juvenile Rearing

-  Water temperatures in the Daguerre Reach may be adverse from May through October
-  Predation by warmwater fish in the Daguerre Reach is probably higher than in upstream reaches
-  Fewer deep pools in the Daguerre Reach
-  All reaches lack woody debris and shaded riparian
-  Juveniles appear to rear in all reaches

Summary for Fall-run, Spring-run Chinook Salmon and Steelhead

-  Ladders are passable when flows are $<2,000$ cfs
-  Majority of spawning occurs upstream of Daguerre
-  Spring-run Chinook are frequently delayed by high flows in March through May, but water temperatures are generally $<60^{\circ}\text{F}$
-  Passage delay probably results in injury and maybe loss in condition
-  Lower Yuba River may be spawning habitat limited in some years
-  Redd superimposition may be a problem, especially for spring-run Chinook

Alternatives

Improve passage w/o dam modification

- Improve access to spawning habitat
- No change in habitat quantity or quality
- Reduce delay during spawning run
- No change in predation
- No change in rearing/emigration conditions

Remove or modify dam

- Improve access to spawning habitat
- Increase habitat quantity or quality
- Eliminate delay
- Eliminate predation in pool below dam
- Increase habitat for rearing and emigration
- Potential short term disturbance
- Potential access upstream for predators